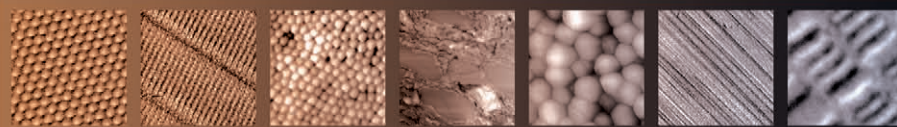




Nanosurf®

Nanosurf® easyScan 2 FlexAFM



Your Versatile AFM System for Materials and Life Science



www.nanosurf.com

easyScan 2 FlexAFM 多功能原子力显微镜



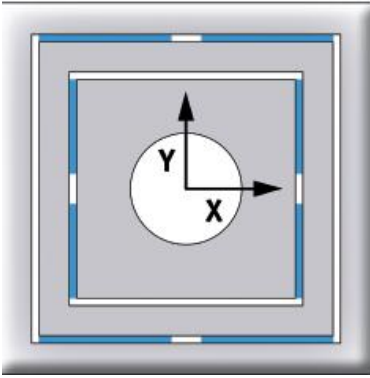
瑞士Nanosurf公司，位于世界精密制造中心瑞士巴塞尔，全球知名的专业研发扫描探针显微镜制造商和技术服务供应商，在扫描探针显微镜领域有超过15年的研发经验，一直致力于新型扫描探针显微镜的创新性研发和制造。瑞士Nanosurf公司在美国等多个国家设有分公司，在全球59个国家销售了近3000套扫描探针显微镜。目前已推出新一代低噪音-快速扫描-超高稳定性的easyScan2 AFM 和大扫描范围Nanite AFM 系统。瑞士Nanosurf公司承诺提供最高品质的服务和客户支持，同时还提供纳米技术的OEM 客户定制，外包等业务。

FlexAFM原子力显微镜是Nanosurf公司最新研发的在大气环境和液体环境下都可以进行测试，并且可与倒置光学显微镜和温度样品台联用。可以满足绝大多数研究的需要。

FLEXAFM原子力显微镜测量模式：接触式原子力显微镜（大气和液态环境），真正非接触式原子力显微镜（大气和液态环境），横向力/摩擦力显微镜（LFM），导电原子力显微镜，磁力显微镜（MFM），开尔文探针（Kelvin Probe），扫描热原子力显微镜（SThM），电容和静电力显微镜（EFM），扩展电阻显微镜（SRM），高级的纳米光刻和纳米操作能力，三维扫描成像。

FlexAFM硬件的特别设计，使得无论在大气环境下还是在液体环境下进行测试，操作和测试的方便程度是完全一样，没有什么区别。easyScan2 FlexAFM 具有以下显著特点：

- 真正的灵活的大气和液体环境测试
- 平坦，线性，快速的扫描技术
- SureAlign™技术，无需激光调整
- 双透镜视窗技术

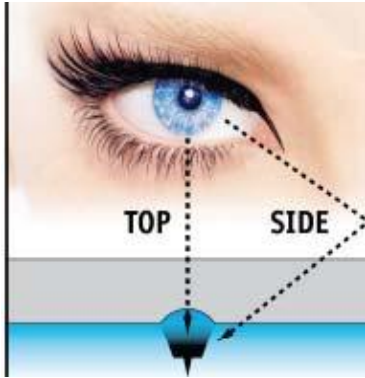


基于灵活弯曲结构的（Flexure）扫描头技术

灵活弯曲结构的扫描头设计，可以应用于平坦的或粗糙的样品表面。

XY-扫描通过电磁驱动，XY 平面的位移是完全线性的。

Z 方向的运动是通过压电陶瓷来驱动，Z 方向的运动速度极快。

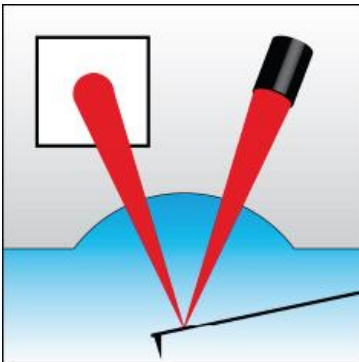


双方向针尖观察透镜

两个方向的透镜视窗，非常便于观察和针尖逼近。

由于特别的设计，

使得无论在大气环境还是液体环境得到同样质量的视像



专利技术SureAlign™激光光学系统

激光光束进入液体时会发生一定偏移，

通常实验时需要耐心和复杂的调整。

而FlexAFM 使用了专利SureAlign™ 的激光光学系统，

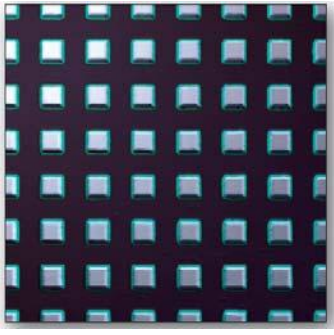
无论是在大气下还是在液体中根本不需要做任何调整。

所以FlexAFM 的激光信号永远处于最佳状态。

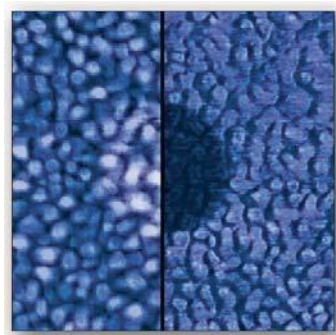
FlexAFM 的针尖固定



AFM 针尖及其固定装置是FlexAFM系统的核心，针尖固定装置包含针尖位置调整部件，用于针尖定位的准确性和重现性，另外也包含了 SureAlign™ 芯片和双视窗透镜技术的部件。整个固定装置通过磁力固定在FlexAFM的扫描器上，这样方便清洗和针尖更换。这种特别的设计，使得无论在空气中还是在液体中的操作一样简单。



标样显示了FlexAFM的扫描线性度



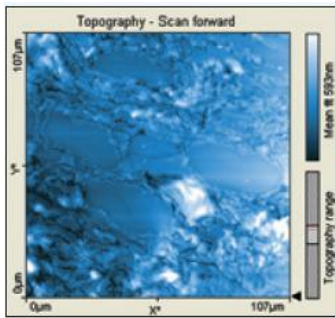
金表面的 Thiois 沉积
左边为扫描图
右边为侧向力图
800nm X 800nm



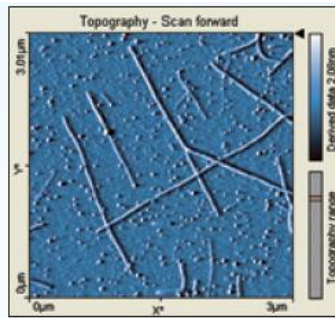
老鼠上皮细胞在缓冲液中测试结果,清楚区别细胞核和细胞质
(1μmX1μm)



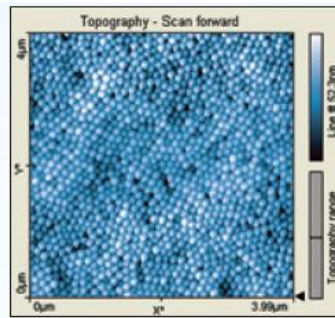
云母上的 DNA样品
(250nmX250nm)



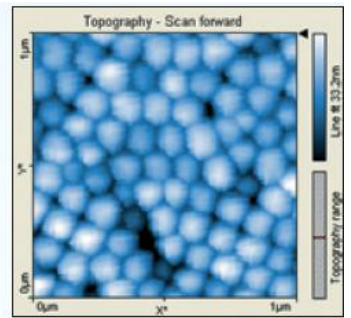
皮肤表面



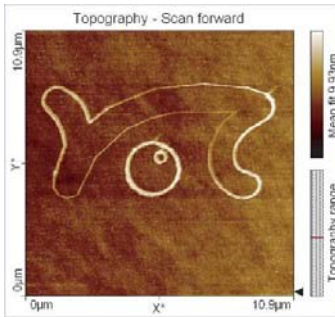
碳纳米管



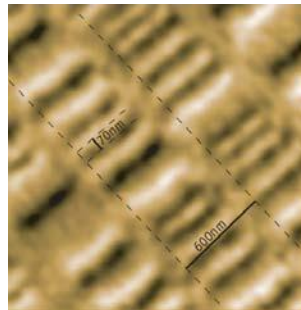
硅胶颗粒



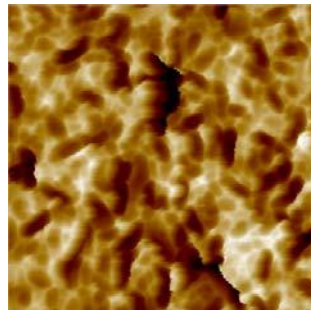
高分辨硅胶颗粒



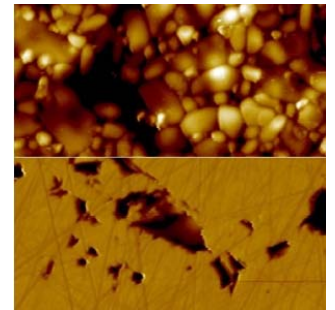
纳米材料表面刻蚀



MFM 成像



太阳能电池表面



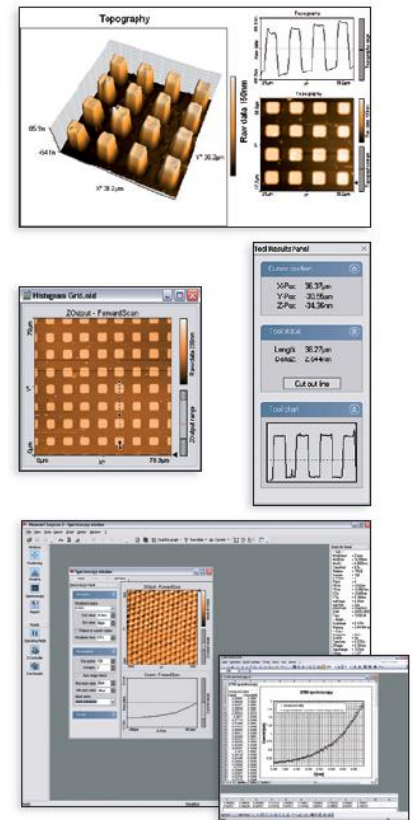
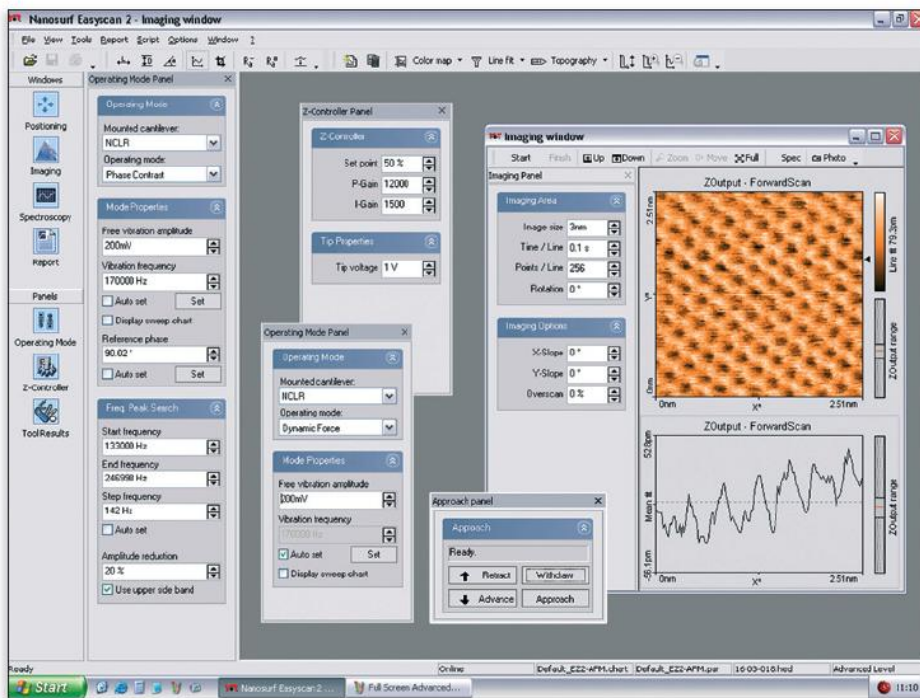
打磨抛光前后陶瓷材料形貌像

Nanosurf easyscan2 软件控制和数据处理

- 简单，易学，自动硬件识别。
- 实时参数调整，标准数据处理功能：背景处理，滤波 3D高度，距离，角度测试等。
- 自动分析材料表面形貌和粗糙度。
- 可进行纳米操作和刻蚀，包括纳米压痕和划痕测试，可分析材料的粘弹性、弹性模量等力学参数。

FlexAFM的操作非常简单，连接扫描头和控制器，通过USB连接电脑，启动软件便可以进行测试。

FlexAFM样品台能非常方便的实现定位和针尖逼近，适用于不同厚度和类型的样品。液体样品可以放入玻璃皿中，再放到样品台上。扫描头上有三个螺钉支架，可以直接放到样品上测试。



FlexAFM可选配防震台，X Y 样平台，光学摄像头，倒置光学显微镜（荧光）等硬件。

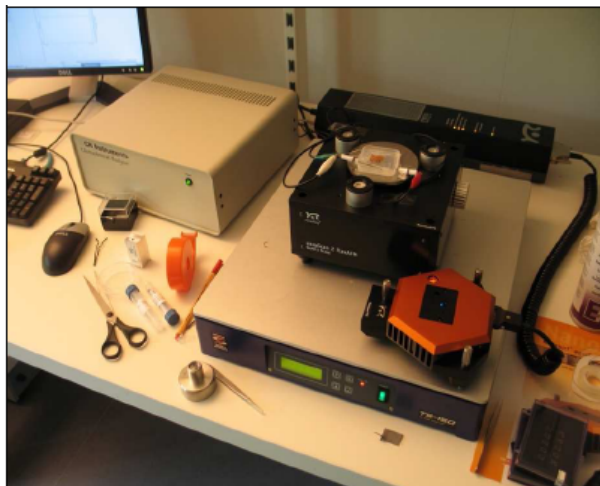


Fig 1.: Initial Topography in NaCl solution

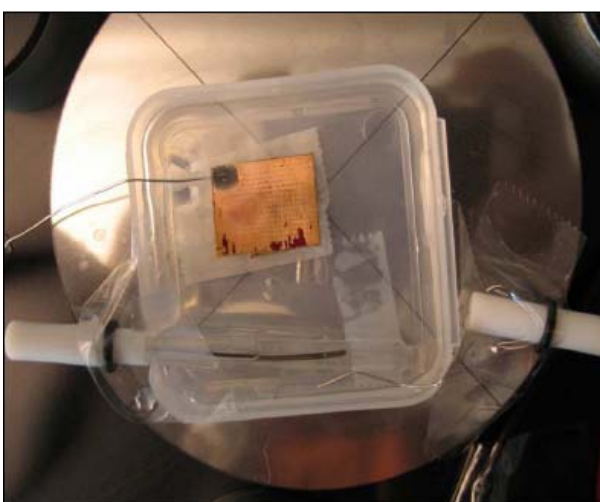
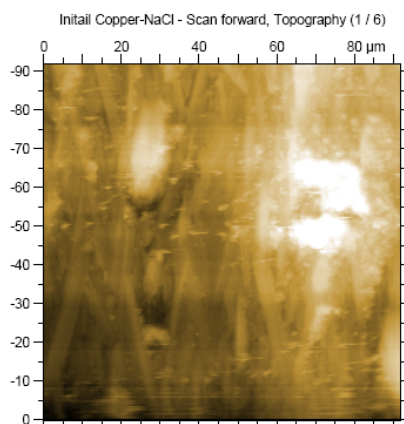
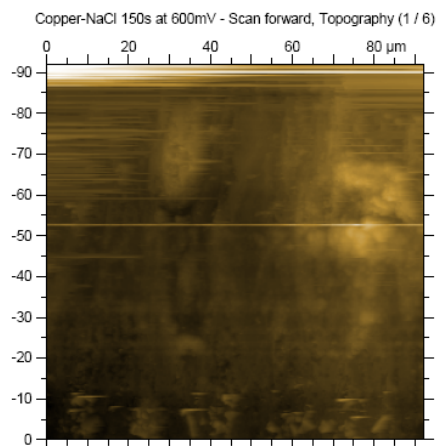


Fig 3: Topo after 150s chemical edging at



FLEXAFM还可以和电化学分析仪联用，实时监测金属腐蚀过程中表面形貌的变化情况。图1为测试前铜片的形貌像，使用的是动态轻敲模式。开路电位（OCP）为-0.347V，做Tafel曲线和点蚀测量以确定点蚀电位。加一个0.6V阳极电位150秒在体系上后，测量铜片的形貌像，如图3所示，可以看到在铜片表面有相当多的变化，由于铜的电化学腐蚀导致材料表面产生了一些物质，在铜样品周围有一些小颗粒。颗粒沉积的痕迹能在形貌像中看到。形貌像显示出表面的凹点。通过软件可得到凹点的平均深度和直径。

中国区总代理



地址：北京海淀区海淀路 19-2 号科城大厦 3021 室 100080

电话：010-62639607, 13911690781

传真：010-62639607

网址：www.jhonors.com

Nanosurf easyScan 2 FlexAFM Scan Heads, Options, and Accessories — Specifications and Features

Scan Head	Large Scan	High Res.
Sample size	Unlimited without sample stage 100 mm on sample stage	
Maximum Petri dish height (fluid level)	9 mm (6 mm)	
Manual approach range	30 mm	
Automatic approach range	1.1 mm	
Maximum scan range	100 μm ⁽¹⁾	10 μm ⁽¹⁾
Maximum Z-range	10 μm ⁽²⁾	3 μm ⁽¹⁾
Drive Z-resolution	0.152 nm ⁽³⁾	0.046 nm ⁽³⁾
Drive XY-resolution	1.525 nm ⁽³⁾	0.152 nm ⁽³⁾
XY-linearity mean error	< 0.1%	
XY-flatness at maximum scan range	typ. 5 nm	typ. 1 nm
Z-measurement noise level (RMS, Static Mode in air)	typ. 0.3 nm	typ. 0.15 nm
Z-measurement noise level (RMS, Dynamic Mode in air)	typ. 0.16 nm	typ. 0.06 nm
Scan head dimensions	143 × 158 × 53 mm	
Scan head weight	1.25 kg	
⁽¹⁾ Manufacturing tolerances \pm 5%		
⁽²⁾ Manufacturing tolerances \pm 10%		
⁽³⁾ Calculated by dividing the maximum range by 16 bits		

Compatible Cantilevers
For use with the Cantilever Holder A0 and Cantilever Holder SA, cantilevers should have: <ul style="list-style-type: none"> • Grooves compatible with the alignment chip used by Applied Nanostructures, BudgetSensors, NanoSensors, NanoWorld, Nascatec, and VISTAprbes • A width of 40 μm or more • A nominal length of 225 μm or more (shorter cantilevers must either be of the XY-alignment series type, or require laser adjustment) • A coating on the backside of the cantilever that reflects red light With the Cantilever Holder ST, Anasys cantilevers of the GLA or AN2 type should be used

FlexAFM Video Camera	
Camera system	3.1 MP high-resolution color video camera for top view. 1.3 MP high-contrast monochrome camera for side view.
Optical resolution	3 μm for top view
Zoom range	4-Fold digital zoom in 3 steps (1/2/4 \times)
Focus	Motorized, user-controlled focus for each camera
Video display	Simultaneous display of top and side view in software
Video output	Direct USB 2.0 connection



Microscopy Made Easy

Nanosurf AG

Grammetstrasse 14
CH-4410 Liestal / Switzerland

Phone: +41-61-927 56 46
Fax: +41-61-927 56 47

Nanosurf Inc.

999 Broadway, Suite 205
Saugus, MA 01906 / USA

Phone: 781-549-7361
Fax: 781-549-7366

www.nanosurf.com

Features	
General design	Tripod stand-alone, flexure-based electromagnetically actuated XY-scanner, piezo-based Z-scanner
Cantilever alignment	Automatic alignment for cantilevers with alignment grooves. Manual laser adjustment possible for special cantilevers.
Laser adjustment	No adjustment required upon immersion of cantilever into liquid because of SureAlign™ laser optics (patent pending)
Electrical connection to tip	Available
Sample observation	Top and side view in air and liquid
Sample illumination	White axial illumination for top and side view. Transmission illumination with illuminated sample holder.
Cantilever holder	Cleanable and replaceable cantilever spring
Operating modes	Static Force Lateral Force Dynamic Force Phase Contrast Magnetic Force Electrostatic Force Kelvin Probe Force Scanning Thermal Spreading Resistance Force Modulation Multiple Spectroscopy modes Lithography and Manipulation modes

Nanosurf easyScan 2 Scripting Interface	
Applications	Automation, lithography, custom evaluation functions, third party measurement equipment, ...
Included control software	Windows Scripting Host: Visual Basic Script, Java Script
Remote control by	COM compatible languages: LabView, MathLab, Visual Basic, Delphi, C++, ...

Nanosurf easyScan 2 Signal Module S	
Available output signals	X-Axis, Y-Axis, Z-Axis, Approach, Tip Voltage, STM Current or AFM Deflection, Excitation, Amplitude, Phase
Full scale corresponds to	\pm 10 V, Excitation: \pm 5 V
Power supply output	GND, +15 V, -15 V

Nanosurf easyScan 2 Signal Module A	
All output signals of Signal Module S	
Additional signal modulation inputs / outputs	X-Axis, Y-Axis, Z-Axis, Tip Voltage, Excitation
Free connectors	2 \times Aux (connection made on user request)
Modulation range	\pm 10 V (excitation: \pm 5 V)
User input / output	2 \times 16 bit ADC / DAC converters, \pm 10 V
Additional analog user outputs	2 \times 16 bit D/A converters, \pm 10 V
Synchronization output	1 \times TTL: start, end, point sync
Additional modes	Almost unlimited

FlexAFM Micrometer Translation Stage	
Travel	13 mm in X and Y
Repositioning precision	Better than 10 μm
Straight line accuracy	Better than 10 μm